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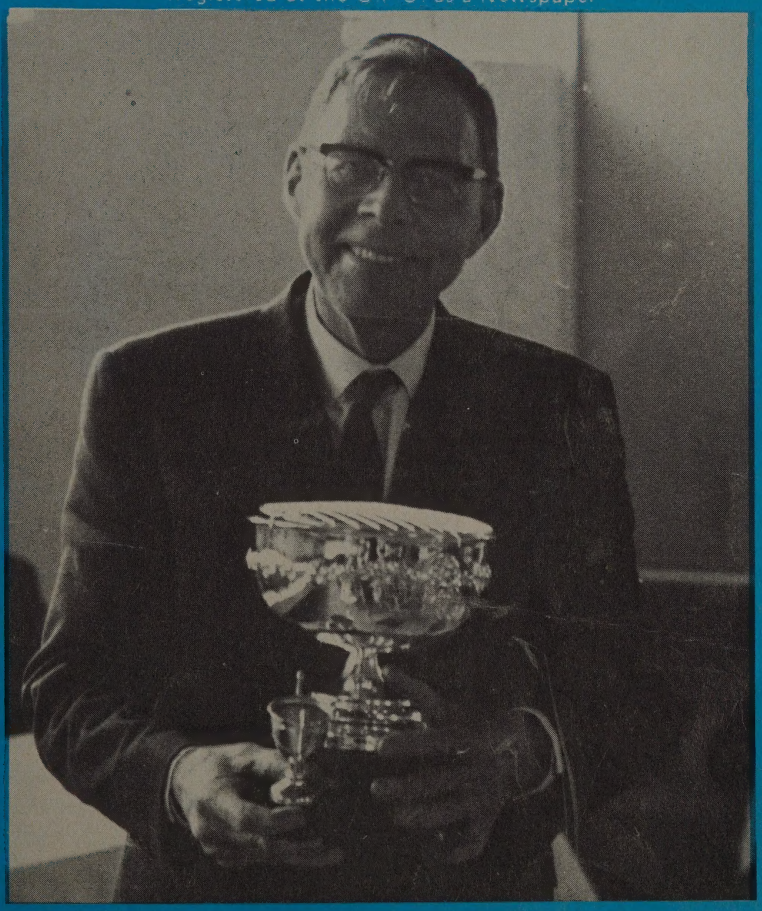

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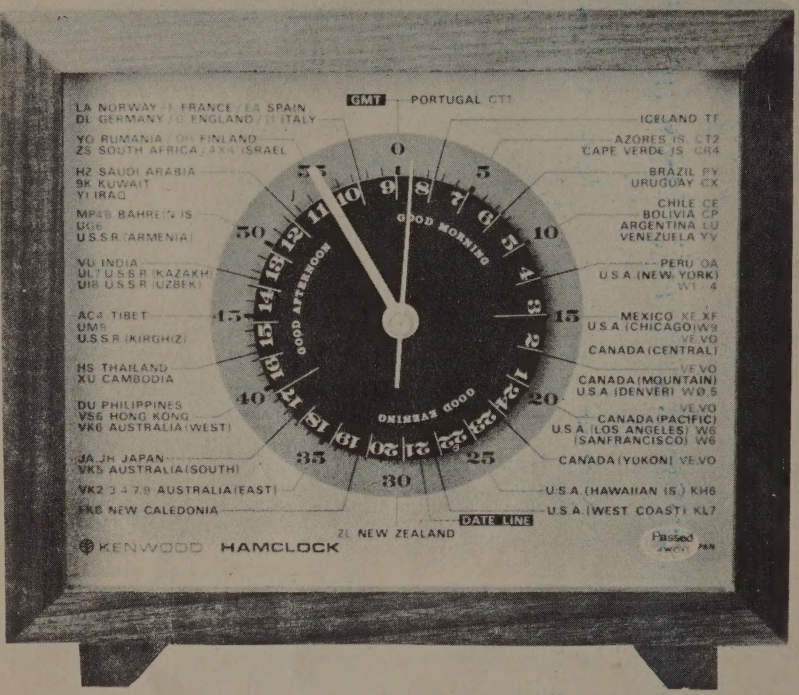

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REDAKTEUR: Muriel Alexander ZS1-001

EDITORIAL COMMITTEE: Ray Alexander ZS1IM
REDAKSIE KOMITEE: Colin Duff ZS1CA

DRAUGHTSMAN:
TEKENAAR: N. B. de Jongh ZS1MM

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This edition of Radio ZS comes to you through the efforts of Tak Boland Branch members who have contributed the articles. Our thanks to all who submitted articles.

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PLEASE NOTE THAT COPY FOR RADIO ZS SHOULD REACH THE EDITOR BY THE 10TH OF THE MONTH PRIOR TO PUBLICATION.

NEEM ASSEBLIEF KENNIS DAT ALLE KOPIE VIR RADIO ZS DIE REDAKTEUR TEEN DIE 10DE VAN DIE MAAND VOOR UITGAWE MOET BEREIK.

Aspekte in die ontwerp van

Klas C Drywingsversterkers

deur ZS1HC

In die ontwerp van 'n hoogdrywing radiofrekwensie versterker word die ontwerper gekonfronteer met die taak om 'n gegewe uittreedrywing, by 'n bepaalde frekwensie (of frekwensie-bereik) aan 'n gegewe las (die antenne) te lewer. Dit moet gedoen word met die hoogste moontlike benuttiging en met inagneming van die tipe sein (ongemoduleer of, indien gemoduleer, die tipe van modulasie), en die koste en beskikbaarheid van baankompenente, kragbronne, en transistors en vakuumbuise.

Ten einde die hoogste moontlike benuttiging te verkry word daar, indien moontlik, gebruik gemaak van klas C versterkers, met klas B werking as 'n grenstoestand. Laasgenoemde word dan ook normaalweg net gereserveer vir liniêre versterkers, dws waar versterking van 'n vooraf-gemoduleerde dragolfsein nodig is (soos onder andere in enkel-syband kommunikasiestelsels).

In die hoogdrywingsbereik (1000 watt en meer) word daar, hoofsaaklik vanweë ekonomiese oorwegings, tans nog feitlik uitsluitlik gebruik gemaak van vakuumbuise ipv transistors. Dat hierdie prentjie vinnig besig is om te verander kan nie betwyfel word nie, maar skrywer verwag dat die vakuumbuis op hierdie gebied vir ten minste nog 'n dekade die botoon sal voer. Triodes, tetrodes of pentodes word algemeen gebruik. Die tetrode en die pentode besit die voordeel bo triodes in die sin dat (i) 'n kleiner beheerrooster-seindrywing vir dieselfde uittree-drywing benodig word, en (ii) die feit dat neutralisasie normaalweg nie voorsien hoef te word nie, veral nie in die laer frekwensiegebiede nie. As gevolg van probleme om die skermrooster te verkoel is tetrode en pentode senderbuise gewoonlik nie beskikbaar vir anodeverkwistings van meer as ongeveer 10 kW nie — 'n probleem wat, gelukkig, nie aan die amateur hoofbrekens besorg nie!

TIPES RF DRYWINGSVERSTERKERS

Daar word onderskei tussen die volgende basiese tipes van RF drywingsversterkers:

ONGEMODULEERDE VERSTERKERS:

Hanteer 'n sein van konstante amplitude, soos in gelykgolf-telegrafie, RF verhitters vir die nywerheid, en frekwensie-modulasie doeleindes, wat frekwensie-skuif sleuteling vir teledrukkers insluit.

GEMODULEERDE VERSTERKERS:

Word toegepas vir amplitude-gemoduleerde seine waarin die dragolf en die (oudiofrekwensie) modulerende sein aangelê word ten einde AM te verkry. Hiervoor word algemeen gebruik gemaak van gemene katode skakelings wat in klas B of klas C werk; vir sommige toepassings word die gemene rooster skakeling algemeen toegepas. Klas A voorspanning kan nie gebruik word nie aangesien nie-liniêre werking 'n noodsaaklike vereiste vir AM is.

LINIÊRE VERSTERKERS:

Word gebruik om 'n vooraf-gemoduleerde sein te versterk sonder dat addisionele vervorming in die sein teweeg gebring word. Vir 'n maksimum toelaatbare modulasie-diepte van 100 persent moet klas B werking gebruik word. Beide die gemene katode en die ge-

mene rooster skakelings kan gebruik word, waarvan die laasgenoemde belangrike voordele inhou vir hierdie toepassing. 'n Onlangse ontwikkeling in die liniêre versterker gebied is die verspreide versterker, wat basies 'n wyeband drywingsversterker is wat gebruikmaak van verspreide netwerke. Die voordele van die verspreide versterker is die feit dat geen instemming nodig is nie en dat dit 'n aantal afsonderlike seine binne 'n gegewe bandwydte gelyktydig kan hanteer — voordele wat veral vir kommersiële dienste nuttig is. Vanweë die kompleksiteit van die opstelling en die feit dat die intreeseine uiters suiwer moet wees, vind dit weinig toepassing in die amateur veld.

KLAS C DRYWINGSVERSTERKERS

Dit is bekend dat die anodestroom-vloeihoek in klas C drywingsversterkers minder as 180° bedra. Daar bestaan verskeie oorwegings waarop die keuse van die anodestroom-vloeihoek berus. 'n Anodestroom-vloeihoek van 180° (dws klas B werking) lewer die maksimum uittree-drywing aan die las, maar vertoon 'n redelik lae benuttiging ('n teoretiese maksimum van 78 persent, prakties ongeveer 60 persent). Die benuttiging (dws die verhouding van nuttige RF drywing aan die antenne tot die GS toevoerdrywing na die finale stadium) kan verhoog word indien die anodestroom-vloeihoek afneem, en teoreties bedra die benuttiging 100 persent vir 'n anodestroom-vloeihoek van 0°. Laasgenoemde is egter nie juis 'n bruikbare proposisie nie, aangesien die RF uittreedrywing van die stadium dan ook nul bedra. Terwyl die benuttiging verhoof wanneer die anodestroom-vloeihoek afneem, neem die RF uittreedrywing af, sodat 'n kompromie êrens nodig is.

'n Anodestroom-vloeihoek van 120° lyk teoreties aantreklik, maar juis by hierdie waarde van anodestroom-vloeihoek word die maksimum tweede harmonieke uittreedrywing verkry. (Vir frekwensie-verdubbelaars lewer $\emptyset_a$ = 120° dus 'n optimum ontwerp!) Op dieselfde wyse moet frekwensie-verdriedubbelaars 'n $\emptyset_a = 90°$ besit.

Gelukkig neem die tweede harmonieke uitstraling of wanneer $\emptyset_a$ toeneem bokant 120°, en 'n waarde van 160° word algemeen deur professionele sender-ontwerpers gebruik.

Teoretiese oorwegings dui daarop dat 'n buiskeuse gemaak kan word ogv die toelaatbare anodeverkwisting van die stadium. Vir 'n ongemoduleerde (gelykgolf) klas C drywingsversterker, met $\emptyset_a = 160°$ en 'n anode-benuttiging van (prakties) 66 persent, kan die nuttige RF uittreedrywing P_{uit} gelykaan twee maal die toelaatbare anode-verkwisting P_a bedra, dws.

$$P_{uit} = 2P_a$$

Vir die tipe 6146 pentode dui die vervaardigers 'n toelaatbare anode-verkwisting van P_a = 20 watt (volgehoue diens) of P_a = 25 watt (onderbroke diens) aan, sodat soveel as 40 watt volgehoue diens, soos in FM, frekwensie-skuif-sleuteling, ens) of 50 watt (onderbroke diens, soos in gesleutelde telegrafie) uit die 6146 "gehaal" kan word. Dit geskeid egter teen 'n anode-benuttiging van 66 persent, wat beteken dat die GS toevoerdrywing na die stadium onderskeidelik 60 watt (volgehoue diens) of 75 watt (onderbroke diens) bedra. Ongelukkig is dit hierdie drywing wat deur die owerhede gespesifiseer word. 'n Sender vir gelykgolf telegrafie met 'n tipe 6146 in die finale stadium kan dus 'n GS toevoerdrywing van 75 watt verdra, maar hiervan word slegs 50 watt deur die antenne uitgestraal (en dan slegs wanneer die sender korrek by die antenne aangepas is!).

BUISKEUSE VIR LINIÊRE VERSTERKER

Teoretiese oorwegings dui aan dat, vir volgehoue diens, 'n gemene katode klas B liniêre versterker 'n buis be-

☞

nodig waarvan die anodeverkwisting gelykaan tweemaal die gevraagde RF uittreedrywing is, oftewel

$$P_{uit} = \frac{1}{2}P_a$$

Hierdie buiskeuse veronderstel 'n volgehoue 100 persent modulasie, wat gelukkig met spraak nooit nagekom word nie. Op grond hiervan sou 'n 6146 slegs 10 watt kan lewer in 'n liniêre versterker, maar hierdie syfer kan dikwels tienvoudig groter wees met spraakseine sonder dat die buis té ongelukkig sal voel.

Vir die gemene rooster skakeling as klas B drywingsversterker is

$$P_{uit} = 2\frac{1}{2}P_a$$

sodat 'n 6146 onder volgehoue toestande van 100 persent modulasie 'n RF uittreedrywing van 50 watt kan lewer in hierdie skakeling.

AM GEMODULEERDE KLAS C STADIUM

Onder volgehou toestande van 100 persent modulasie is die gemiddelde anodeverkwisting $1\frac{1}{2}$ maal groter as die anodeverkwisting wanneer geen modulasie aangelê word nie. Hierdie gemiddelde verkwisting kom egter nooit voor wanneer spraak of musiek versend word nie, sodat die werklike anodeverkwisting met sulke seine (selfs met 100 persent modulasie tydens spraak- of musiek-pieke) veel nader aan dié van die ongemoduleerde geval streef. (Terloops moet daarop gelet word dat die kruin oombliks-verkwisting in die buis 2.66 keer groter is as die verkwisting onder ongemoduleerde toestande; wat egter van belang is is die gemiddelde verkwisting, en dié is slegs 1.5 keer groter as die geen-modulasie toestand). In ooreenstemming met die geval van die ongedoduleerde sender, sal

$$P_{uit} = \frac{2}{3} \times 2P_a = \frac{4}{3}P_a$$

sodat 'n tipe 6146 onder volgehoue toestande 16.6 watt, en onder onderbroke diens toestande 33.3 watt dragolf drywing aan die antenne kan lewer, wat (met 66 persent benuttiging) ooreenstem met 'n GS toevoerdrywing van 40 watt (volgehoue diens) en 50 watt (onderbroke diens).

'n Interessante berekening kom voor wanneer die modulerende drywing (wat deur die modulator voorsien moet word) bereken word. Die modulator moet nie net die sybanddrywing (wat 50 persent van die dragolfdrywing bedra) voorsien nie, maar ook die 50 persent toename in die anodeverkwisting van die klas C stadium wanneer dit gemoduleer word. Met aanname van 'n benuttiging van 80 persent in die klas C stadium, moet die modulerende drywing $\frac{5}{8}$ van die RF uittreedrywing bedra. Vir 'n tipe 6146 buis vir onderbroke diens met 'n GS toevoerdrywing van 50 watt sal tipies 33.3 watt aan die antenne gelewer word, sodat 'n modulator van $\frac{5}{8}$ (33.3) = 21 watt voorsien moet word. Dit is so iewat minder as die „rowwe" reël dat 'n 50 watt sender (bedoelende die GS toevoerdrywing) 'n modulator van 25 watt vereis. RADIO ZS

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'N AFNAME IN AMATEURRADIO

deur ZS1RF

Wanneer oor die Amateurbande geblaai word wil dit voorkom asof bostaande aanhef korrek is. Luister na die 80 meterband: 'n doodse stilte – miskien so nou en dan 'n optimis wat sonder welslae CQ roep. Van 160 meter praat ek nie want in daardie geweste loop 'n mens net vistermanne raak wat hul makkers d.m.v. „vistermanstaal" kontak. Die 40 meterband is net vir 'n beperkte tyd bruikbaar; andersins is dit besmet met seine van tot 50 kilowatt, voor en agter die Ystergordyn, om nie te praat van spookseine uit eie bodem wat willens en wetens vir verdere frustrasie teenwoordig is nie. Op 20 meter loop 'n mens sporadiese DX raak en dan moet jy genoeg tyd en geduld en goeie maniere aan die dag lê om na 'n uur of meer se wag en probeer tevrede wees met: „Sorry that ZS-station, negative copy O.M."! Nie 'n wonder nie dat van ons vriende na 6- en 2 meter gaan waar elke kontak 'n besondere ondervinding is.

VERHOOGTE LEWENSTEMPO:

'n Afname dus! Waarom? Amateurradio is 'n stokperdjie en seer seker die mees interessante vryetyd besteding moontlik denkbaar. 'n Stokperdjie is vryetyd besteding en om ledige uurtjies nuttig te vul! Het die hoë lewenspeil wat ons vir onsself daargestel het, die verhoogde lewensduurte, versnelde lewenstempo en ander faktore van ons tyd, waarvoor ons ons buitengewoon moet inspan, ons nie van ons ledige uurtjies beroof nie?

TEGNIESE EKSAMEN:

Omdat die Republiek van Suid-Afrika op 'n baie laat stadium met die Tegniese eksamen, as vereisde vir die verkryging van die Amateurlisensie, begin het is daar tans 'n baie klein persentasie tegnies bevoegde Amateurs. Dus ook 'n klein hoeveelheid tegnies-weetgierige belangstellendes wat bereid is om van die stokperdjie te leer en daarom het die bydrae van die Radio-amateur tot tegniese ontwikkeling geweldig afgeneem.

Is die Amateurradio-operateurssertifikaat-eksamen moontlik aanspreeklik vir 'n afname aan belangstelling? Met die instelling van die eksamen is baie goed bedoel en is aan ons land 'n groot diens bewys. *Dit was nie die doel van die owerheid om ons en ons vriende van 'n baie aangename tydverdryf te ontsê nie!* Indien iemand genoegsaam belangstel sal geen toets of eksamen hom of haar kan weerhou om die uitsaailisensie te bekom nie. Die groot vraag bly egter; wat doen ons as gelisensiërde Amateurs om ons luisteraarsvriend te help om sy of haar lisensie te bekom?

AARD VAN BELANGSTELLING:

Die belangstelling in amateurradio kan ook van uiteenlopende aard wees. Vir 'n groot gedeelte is die mikrofoon en die „gesels" deel van die stokperdjie van primêre belang en hul beywer hul nie om meer van die werking van die sender, ontvanger en lugdrade te weet nie. Diegene geniet slegs 'n baie beperkte deel van die ontspanning en dit duur nie lank nie of die OK bly lank van die lug af. Die gedeelte van die radioamateurs wat self bou, toets, eksperimenteer en selfs ontwerpe aanpak, en ook met sy makkers gesels en hul van tegniese raad voorsien put alle moontlike genot uit die tydverdryf en is van groot nut vir sy mede amateurs. Seningkou-geselsies van nie-tegniese aard het wynig bygedra tot die uitbouing van amateurradio.

SONVLEKKE:

Sien Fig. A.

Plaaslike syfers is nie beskikbaar nie maar in W-land is 'n opname gemaak vir die sonvleksiklus 1954 – 1964, en

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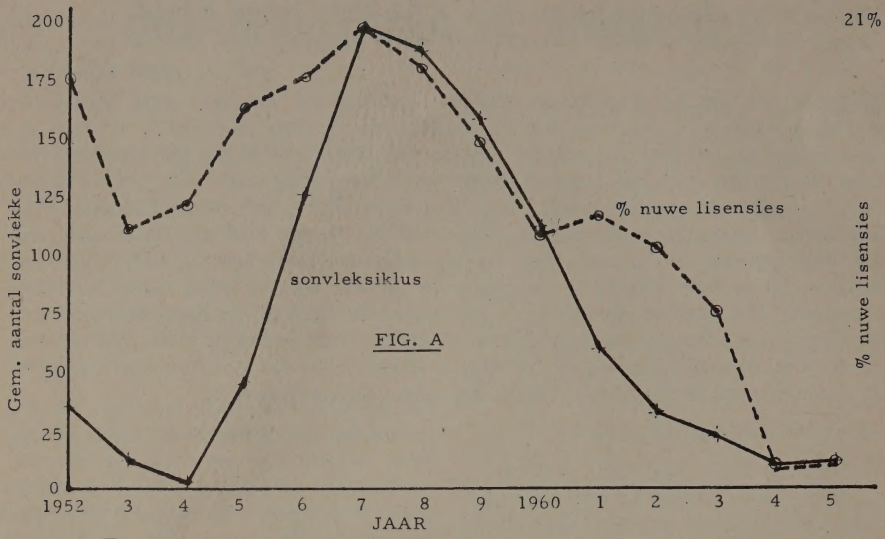


FIG. A

het getoon dat tydens die maksimum sonvlekke in 1957, die persentasie nuwe amateurlisensies 21 persent van die lisensietoetaal was en met minimum sonvlekke in 1964 slegs 2 persent. Die dood moet 'n oorsaak hê! Waar is ons nou in die sonvleksiklus?

ENKELSYBAND:

Hierdie baie effektiewe tipe uitsending met 'n deurdringvermoë van byna gelykstaande aan GG is as moontlike oorsaak tot afname geneem. Die voornemende amateur en die OK's wat graag briewe lees verstaan die „skrif" nie en vertolk dit as „Donald Duck" omdat die AM-ontvangers dit so ontvang. Hoeveel verloor amateurradio deur hierdie belangstellendes uit te skakel? Sou dit onhoflik wees om te sê dat indien genoegsame geesdrif by die belangstellende bestaan, hy of sy 'n poging sou aanwend om die onleesbare taal verstaanbaar te maak? ESB is baie moeilik om te bou en bo die vuurmaakplek van die gewone radioamateur en moet dus in volledig werkkende toestand soos 'n yskas of 'n stoof gekoop word en getuig van 'n gebrek aan ondernemingsgees.

'n Baie begaafde amateur, ZS1MM, het eenmaal in CQ Boland 'n stroombaan van 'n ESB Sender geplaas, bestaande uit drie lampies en 'n minimum van komponente, wat hyself gebou en getoets het. Die ontwerper van die stroombaan het dit opsetlik eenvoudig gemaak; spesiaal vir die onontwikkelde lande van Afrika; en dit sluit sekerlik nie die Republiek van Suid-Afrika in nie; tog weet die skrywer nie van ander senders behalwe van ZS1MM wat gebou is nie.

IS HERSTEL MOONTLIK:

Ja — indien elkeen van ons iets doen — hoe gering ook al — om die bestaansreg van die radioamateur te bevestig en op te bou. Ons kan nie toelaat dat ons aangename tydverdryf en ons frekwensies, hoe beperk ook al, van ons weggeneem word nie.

1. VERBETER TEGNIESE BEVOEGDHEID

Deur te lees en te studeer in boeke soos „The Radio Amateurs Handbook, CQ, The Radio Handbook en Radio ZS", sal u tegniese kennis vermeerder. Hierdie boeke is geskryf deur bevoegde amateurs sodat ons dit kan verstaan. Bepeins probleme en gesels met u vriende daaroor. Selfstudie sal ons ook in staat stel om ons luisteraarslede te

help en aan te wakker om hulself te bekwaam om die tegniese eksamen te slaag.

2. BOU EIE TOERUSTING

Daar is wel grondige redes vir die populariteit van fabriek-geboude toerusting, veral weens die ingewikkelde komplekse tegnieke soos ESB, wat dit moeilik maak om self te bou. Groot tekort aan ledige uurtjies is reeds genoem en die beter herverkoopwaarde van komersiële toerusting ontmoedig die bou-entoesias. Behalwe bostaande is daar tog baie gedeeltes van die stokperdjie wat gebou kan word soos versterkers, kragbronne, meet- en toets apparate. Daar is ontspanning en genot in die bou van muggie-krag toerusting by die inspan van transistors om te verkry wat ons met lampies verkry het.

3. TEGNIESE BYDRAES

Dit verskaf bevrediging wanneer ons 'n bydrae van ons ondervinding en eksperimentele werk vir plasing aan Radio ZS lewer. Op die gebied van BHF en UHF kan ons baie van ons mede amateurs leer. 'n Klein wenkie, hoe gering ook al, mag van groot hulp wees vir iemand wat al lank met 'n soortgelyke probleem sukkel.

4. AKTIWITEITE

Die getroue bywoning van takbyeenkomste en deelname aan liga-aangeleenthede is 'n groot stimulus vir u medebelangstellendes. Hoewel ons in die R.S.A. in 'n baie beperkte mate die geleentheid gebied word om ons medemens te dien, kweek dit belangstelling en goeie buurskap wanneer ons van hulp is tydrenne, „Jamboree on the air" en CQ Hou Koers. Baie van genoemde jongspan is ons toekomstige radio-amateurs.

5. AKTIVERING VAN JEUG

Die radio-amateur van die toekoms is die skolier en die student van vandag. Dit is derhalwe noodsaaklik dat daar by diegene 'n belangstelling vir die amateur-radio-bewing aangewakker word. Ons eie of die bure se seuns (dogters?) jeugorganisasies soos die Voortrekkers en die Scouts moet aandag kry — meer as net die reël van 'n „CQ Hou Koers" of „Jamboree" van die lug saamtrek — moet ons onverdeelde aandag kry. Morse-kode uitsendings met gemoduleerde oudiosein-skakeling (sodat dit op gewone ontvangstelle ontvang kan word), projekte soos die bou van klein stukkies elektroniese toerusting, ens. kan alles meehelp om amateurradio vir die jongmense (wat baie dikwels afgeskeep word) 'n lewende stokperdjie te maak.

6. OPENBARE BETREKKINGE

Hier kortliks; indien moontlik, sover dit van u afhang; leef in vrede met alle mense ... veral u bure. Ek vrees die dae van TVI.

Hiermee is aan u weinig meegedeel wat u moontlik nie geweet het nie. Indien nog ander oorsake vir afname-, en wenke tot herstel, bekend is, kan openhartige bespreking moontlik die afname in amateurradio stuit. RADIO ZS

1971 ANNUAL GENERAL MEETING:

The Cape Town Branch Committee who will be our hosts at the Annual General Meeting next year are making reservations on accommodation for the delegates and visitors who will be attending the meeting. They have found that the local hotels expect to be fully booked for the Easter season and that any reservations will have to be made as soon as possible. Will all of our members who intend coming to Cape Town for the meeting please notify Cape Town Branch at P.O. Box 5100, Cape Town, as soon as possible. The reservation fee may be paid later, the main object is to help the Cape Town Branch reserve accommodation while it is still available. Besides hotel accommodation there will be a certain amount of accommodation provided by local hams. RADIO ZS

Eenvoudige 50 Megahertz E.S.B. Ontvormer

Vertaal en aangepas uit A.R.R.L. Handboek 1970. **deur S. S. Burger, ZS1ZN**

Byna elke B.H.F. syband amateur stel belang om met behulp van 'n eenvoudige stroombaan sy bestaande E.S.B. stasie, te omskep om op die hoër bande te werk.

As ons 'n bevredigende E.S.B. stasie het, is dit betreklik maklik om 'n baie stabiele ontvormer vir die hoër bande te bou, en die koste is ook baie gering.

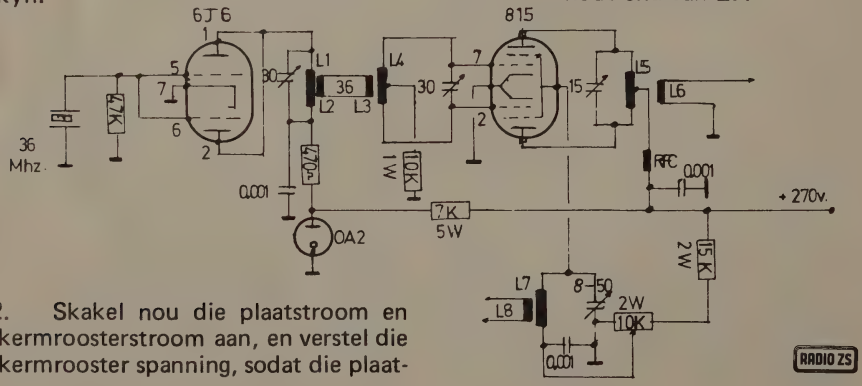
In die stroombaan word die baie bekende 6J6 lampie gebruik vir die kristal ossilator. Hierdie lampie is 'n uitstekende ossilator. 'n 815 lamp word gebruik as menger. Hierdie dubbel tetrode mag miskien nie so bekend by die gewone amateur wees nie, veral nie die jonger geslag nie, maar basies kan dit beskryf word as twee 2E26 lampe, vir een glasomhulsel.

Trek-stoot werking in die menger is verkieslik omdat dit neig om omgewensde frekwensies uit te skakel.

Die ossilator sein word gevoer na albei roosters van die lampie. Die 14 Megahertz sein afkomstig van die bestaande Enkelsyband sender, word by die skermrooster van die 815 ingevoer. Baie min dryf is nodig en geen menger onstabiliteit was merkbaar nie.

Wanneer die stel getoets word, moet opgelet word dat:—

1. Die 36 Megahertz kristal ossilator funksioneer, en dat van 18-22 volt oor die menger roosterweerstand verskyn.



2. Skakel nou die plaatstroom en skermroosterstroom aan, en verstel die skermrooster spanning, sodat die plaatinset krag nie meer as 20 watt is nie — meg geen E.S.B.

3. Voer nou 'n 14 Megahertz E.S.B. sein van 10 watt na die skermrooster stroombaan via L8.

4. Die ingevoerde E.S.B. sein word beheer deur R4.

Die stel soos beksryf, funksioneer goed, en sorg moet gedra word dat die ingevoerde E.S.B. sein nie meer as 20 watt is nie. Met hierdie ontvormer kan ons nou op 50 Megahertz werk, die uitset vanaf die 815 lampie, is ongeveer 15 watt.

SPOELE:

L1 = 8 draaie No. 32 op $\frac{1}{4}$ dm. koolztof kern
L2 = 2 draaie No. 20
L3 = 2 draaie No. 20
L4 = 12 draaie No. 22 — $\frac{1}{2}$" deursnee 32 draaie per duim
L5 = 8 draaie No. 12 — 1" deursnee middel getap
L6 = 2 draaie No. 12 — 1." inmiddel van L5
L7 = 12 draaie No. 20 — $\frac{3}{4}$" deursnee
L8 = 3 draaie No. 20 — koue end van L7.

FROM AN OLD TIMER—

Oom Dok, ZS1CH

I'm sure there will be a measure of interest in knowing how the Old Timers had to struggle to get going on the air.

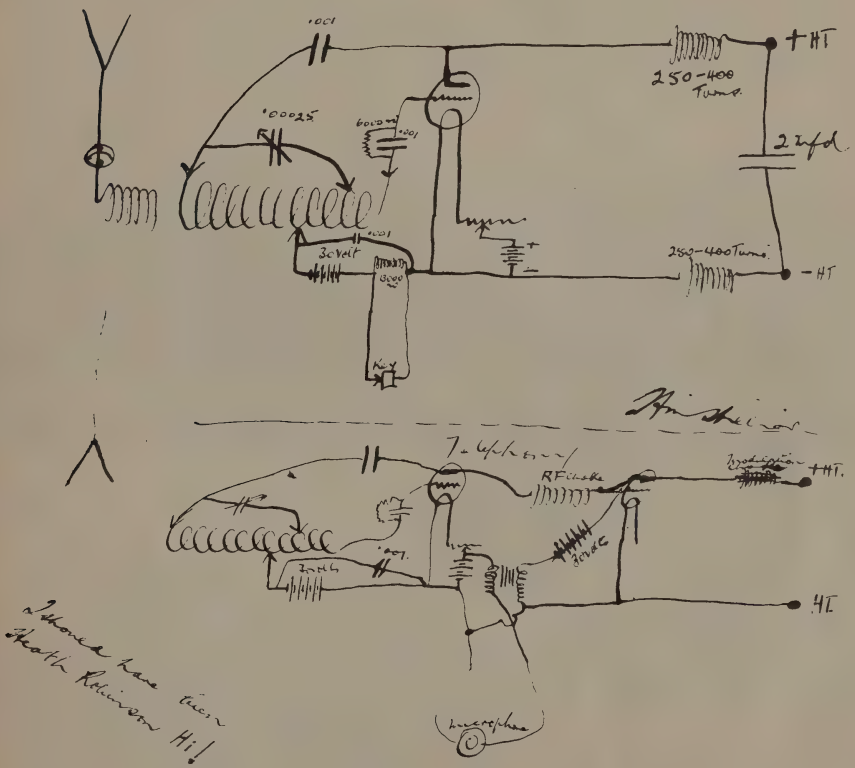
One of the pioneers was a Mr Streeter, who used to broadcast once or twice a week, and was able to be picked up by home made receivers. The original call signs, were like FOA5Z, today ZS1FX, later it was ZT, ZU & ZS. All that was required was a morse test, a testimonial and a circuit diagram. In my case, I got my diagram from the late Mr H. Reeder. It was for AC and Worcester had 540 DC, I passed. My first TX was called a Baby Burgess, and had a BTHB 4 tube. All CW only, at that time.

For an aerial I used a 91 ft. length of wire, with a 7 ft. counter poise. Itwas developed by the late Bill Heathcote. Then ZS6X and I roped DX in like pie.

There was also a Hartley circuit diagram shown. Then came the 2 tube TP.TG. In the meantime, we built receivers, first OV1, then OV2, and when screw

Hartley circuit P5J.

QSY Page 14



Changeover by means of single switch from Telephony to telegraphy although Telephony is only for club use and occasional Test.

USING OLD MOTORS

MAKE USEFUL USE OF YOUR XYL'S DISCARDED WASHING MACHINE OR OLD TYPE REFRIGERATOR MOTORS.

Often I have heard of Hams enquiring after electric motors of some sort to drive their Rotary beams etc; so I decided to publish this article in Radio ZS.

The attached diagram is quite explanatory, therefore no complicated reading. The only mention to be made, is the fact that at least 5-6 amp D.P.D.T. switches are to be used for the Rotation and on/off.

You will notice that a D.P.D.T. switch is used as an on/off one, as so often you could make the mistake of cutting the Neutral line instead of the live line. If the Neutral or dead line happened to be cut, (per mistake), you are in danger of being *electrocuted* when working on your motor.

OPERATION OF THE SWITCH:

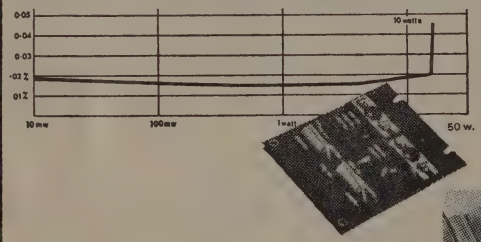
1. To start your motor it is only necessary to switch on at the on/off switch, the motor will start to run in the direction that has been selected by the changeover switch. In order to change the direction, first switch off at the on/off switch — wait for the motor to stop, and then change the direction switch.

If this is not done, the motor will not change rotation, as the starting contact in the starting switch, has not closed. Most motors are fitted with overload protection (built in), but I do think that a 5 amp fuse should be fitted in the live supply line.

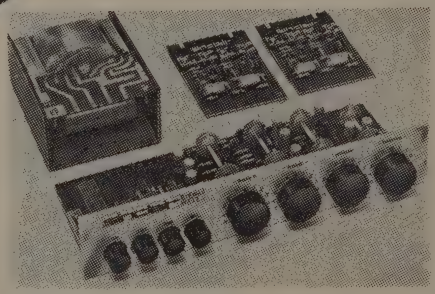
SINCLAIR EQUIPMENT

APPLICATIONS

High fidelity amplifier; car radio amplifier; record player fed direct from pick-up; intercom; electronic music and instruments; P.A., laboratory work, etc. Full details of these and many other applications are given in the manual supplied with your Z.30.



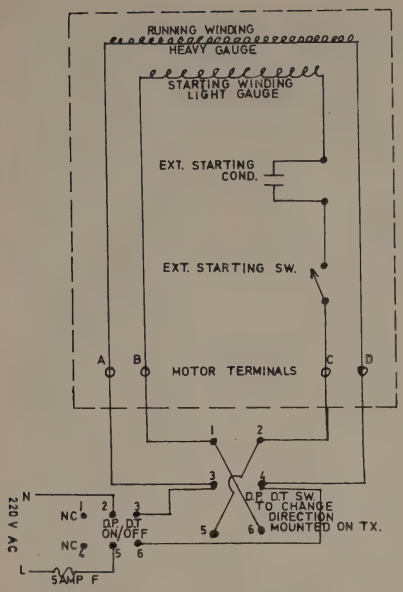
Z12 Amplifier	R12
Z30 Amplifier	R18
Stereo 25 Control Units	R30
Stereo 60 Control Units	R36
PZ4 Powerpack	R15
PZ5 Powerpack	R18
PZ6 Powerpack	R22



POSTAGE PAID C.O.D. OR C.W.O.

TRADE ENQUIRIES WELCOME

RADFO DISCOUNTS, P.O. BOX 564, MUTUAL BLDG, HARROWER ROAD, PORT ELIZABETH



MOTOR CONNECTION DIAGRAM.
ZS1NU

CAUTION:

Please note that when driving gears or pulleys at high speed, there is no possible danger of getting your fingers caught in them, as you are careful and afraid of speed, but when driving them at a slow speed, 40-1 RPM, it becomes *very* dangerous as you have a very high torque, and for this reason you are slowly but surely having your fingers crushed, and limbs and flesh torn off.

In other words SLOW driven machinery is much more dangerous to human life than high speeds.

ZS1NU.

RADIO ZS

Die oorhandiging van die Stassen verdiens — Telikheid Beter aan Anne Gavin ZS1-199, deur Corrie l.v. van O.K. Dan ZS1DF.

Anne is die l.v. van O.K. Dennis ZS1NU, en as lede van Tak Boland, wil ons net weereens vir haar baie dankie sê vir die baie goeie werk wat sy doen, as Tesouriere van ons TAK. — Dan ZS1DF, Voorsitter, Tak Boland.

AM-SSB RECEPTION

by ZS1NU

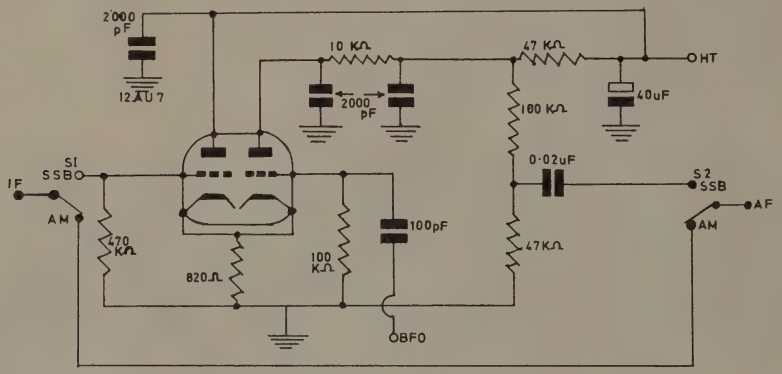
There are quite a few of us who have very good AM receivers, and would not like to part with them, but rather convert them to receive SSB, by using a simple method.

Here is a very easy Product Detector for the reception of SSB signals which may be of use to the "building" Ham.

Various forms of Mixer Detectors have been introduced to reduce intermodulation at low signals. When a Product Detector is used, two input signals are fed to what is basically a Mixer stage (1) the incoming signal at the intermediate frequency (2) a signal from the B.F.O. The difference in frequency represents the A.F. output, and after suitable filtering to remove the components of the original signals, is fed to the A.F. stages.

The diagram herewith, shows a typical circuit using a double triode tube (12AU7).

It must be appreciated that this type of detector can be used both for SSB. and CW. but is not suitable for AM reception, so must be switched to SSB., CW. or AM.



PRODUCT DETECTOR ZS1NU

RADIO ZS

continued from page 11

grid tubes emerged, IV2. All condensors, resistances, coils etc. were home made, except tubes. The first essays into phone, was by putting a link coil into the final coil, and with a carbon mike attached.

With my Baby Burgess on CW, I worked Commander Beard, on board the *Ellinor Bolling,* in the Antartica, and received a QSL card in due course. Our society was then S.A.R.R.L. and our magazine was called CQ. I regret to say that so few of my 1929 Ham friends are still with us.

Joe White was for a long time the President of our league, and was "Personal Grata" with all PMG's.

The WAC certificate was the prime honour to get in those days, and yet later, I often worked it in one night.

There were no bureau stickers then, and I know that it often cost me 2/6 in postage after a good DX day.

Conditions were generally good, until sunspots could be blamed for interferences.

RADIO ZS

Die oorhandiging van die D.F. de Vries 40 meter Mobiele Trofee aan Frank Stayner ZS1DJ, deur Corrie l.v. van O.K. Dan ZS1DF (op die agtergrond so sedig soos 'n predikant).

Frank het die beker verower deur 59 kontakte te maak op 40 meter, vanaf 'n mobiele sender.

Hierdie kompetisie sal nou elke jaar op 31 Mei gehou word, vir alle Tak Boland en Kaapstad lede.

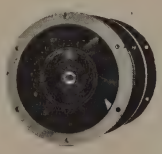
ETRI

Microvent Fans & Blowers

AC

&

DC



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AMENDMENTS TO CALLBOOK NO 22.

*ZS1ZK	Should read P. Le Grange Louw.
ZS2B	S. C. Mare — deleted by P.M.G.
*ZS2BB	B. B. Aucamp, Privaatsak 15, MOLTENO, K.P.
ZS2CU	P. G. J. Kotze, said to have moved to Port Elizabeth — address unknown.
ZS2JH	K. O. Dirkman, said to have moved — address unknown.
ZS2NB	Archie W. Everton, Gansvlei, P.O. PLETTENBERG BAY.
ZS2DG	Deleted by P.M.G.
ZS2FD	Deleted by P.M.G.
*ZS2LR	E. J. van Loggerenberg, 8 Whiteside Road, UITENHAGE. C.P.
*ZS3DF	Danie J. Fourie, P.O. Box 140, OKAHANDJA.
*ZS4AM	Alan S. McAllister, c/o Bremer Mills, P.O. Box 180, HENNENMAN, O.F.S.
*ZS4BB	B. B. Aucamp — delete — see ZS2BB
*ZS4CC	J. C. Slabbert, Posbus 55, Winburg, O.F.S.
*ZS4JM	M. O. Jerling, Steynstraat 13, EXCELSIOR, O.F.S.
ZS4NQ	E. A. Yazbek — Silent Key — deceased.
*ZS4PE	P. C. Beneke, Voortrekkerstraat 168, BLOEMFONTEIN, O.F.S.
*ZS5AR	P. A. Smart, P.O. Box 404, EMPANGENI, NATAL.
*ZS5CU	C. F. Vosloo, Posbus 379, VRYBURG.
*ZS5FE	T. O. S. Hansen, 24 Marion Avenue, GLENASHLEY, DURBAN.
*ZS5JT	W. C. Hieber, 3 Aberfoyle Road, Westville, NATAL.
*ZS5RQ	I. T. Hunter, 6 Balmoral Drive, DURBAN NORTH.
*ZS5WB	Lee Laurie, 44 Starling Place, Fynnland, DURBAN.
*ZS6ABC	Don Davies, 6 Summerside Road, Greenside, JOHANNESBURG.
*ZS6AKC	Rev. T. I. Ferreira, P. K. Radithuso, LICHTENBURG, TVL.
*ZS6ATG	H. A. C. Foot, — now a member.
*ZS6AUD	Herman J. S. van Dijk, 12 Chris Jacobslaan, Sonland Park, VEREENIGING.
*ZS6AYV	M. W. Odendaal, 16 St. Aubyn Road, New Redruth, ALBERTON.
*ZS6AYW	Mrs. C. E. Odendaal, 16 St. Aubyn Road, New Redruth, ALBERTON.
*ZS6CS	H. C. Stuivenberg, 68 Magda Flat, 734 Arcadia Street, PRETORIA.
*ZS6EM	Alan S. McAllister — delete — see ZS4AM
*ZS6QD	C. S. de Beer, P.O. Box 157, POTCHEFSTROOM.
*ZS6TB	L. Kussman, P.O. Box 4660, JOHANNESBURG.
ZS6XQ	Louis Nel — Silent Key — deceased.
*ZS6XZ	H. S. Brammer, 3 Magda Avenue, Dunvegan, EDENVALE, TVL.

PORT ELIZABETH COMMUNITY CHEST CARNIVAL

24th to the 26th September, 1970

AMATEUR RADIO STATION ZS2CCC

The Port Elizabeth Branch of the League, employing the call sign ZS2CCC — specially authorised by the P.M.G. — contacted from the Carnival venue, 167 radio amateurs spread over 144 countries during the three days ended the 26th September last.

The station attracted favourable comment from the general public and it is a pleasure to record the untiring efforts of Bernard Herring (ZS2H) and Barry Jackson (ZS2SG) who did so much to ensure its erection and successful operation.

The gross takings at the Carnival approximated to R15 000 which amount will be divided between 42 charitable bodies functioning in Port Elizabeth and Uitenhage.

Modifications to KW Viceroy MKI SSB Transmitter

by Dennis ZS1NU

As this is quite an old Transmitter, it was noticed that the 40 meter transmission is on the upper side band, instead of the Lower Side Band.

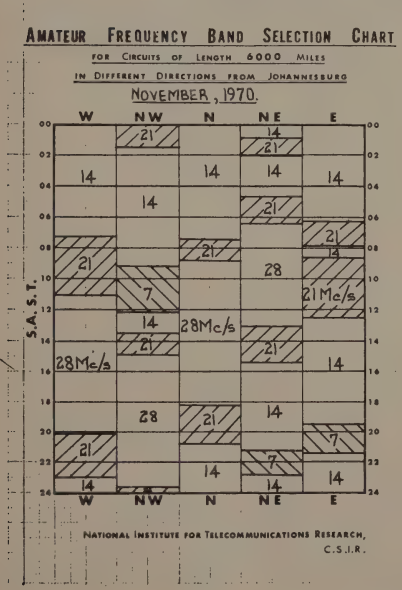
With regard to the modification to the KW Viceroy MK.I for lower sideband operation on 7 Mc/s, I used a crystal for 4815 Kc/s in place of the 5250 Kc crystal. It is also necessary to frequency double in the oscillator stage to 9630 Kc/s and the IF transformer feeding the 2nd Mixer has to have capacity added across the winding by means of a relay, so that this frequency is changed to the other side of the VFO injection. Usually this capacity can comprise a 110 PF compression trimmer with 50 PF silver mica capacitor in parallel across each winding, and the trimmer should be peaked for maximum grid drive to the P.A. stage. Should a crystal for 4815 Kc/s be required, this can be supplied at (Two pounds Ten shillings plus Six shillings for postage — Air Mail) from Messrs. K. W. Electronics (Pty.) Ltd., London, England.

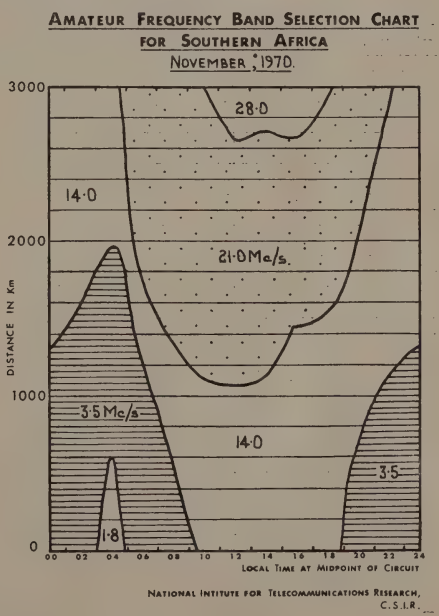
The only way that the Power output can be increased, is by fitting 614B tubes in place of 6146's. No circuit changes are required except that the P.A. bias should be adjusted for a standing current of 70 M/amps (instead of 50 M/amps) and the stage can be loaded 20 per cent higher in power output and speech peaks can also be driven 20 per cent higher.

I trust that the above information is helpful to you.

RADIO ZS

FREQUENCY PREDICTION CHARTS





HOW TO USE R.F. POWER TRANSISTORS

A guide to the practical use of r.f. power transistors in Amateur Radio equipment, including circuit design, matching networks and construction

by Paul Franson, WA7KRE

With acknowledgements to "Amateur Radio" May 1970.

Ever since transistors were announced many years ago, Amateurs have been interested in using them in all types of equipment. Though the advantages of transistors have made them popular for all electronic applications, transistors are especially suitable for portable equipment. Transistors, with their high efficiencies, small size, low heat dissipation, low voltage operation and high reliability, are ideal for portable gear. Many low-power transistor transmitters have appeared in Amateur magazines, and every circuit of this type that has appeared has attracted considerable attention. Unfortunately though, many of the transistors used in these transmitters are really not ideal for this use, since they are switching transistors or low-power amplifiers that don't perform very well in r.f. power service. Higher power transmitters using r.f. power transistors have rarely been described, and most of the circuits that have appeared really couldn't be considered very practical for most Amateur use.

Old r.f. power transistors suffer from four major faults that have limited their usefulness; low gain, limited power output, high cost, and perhaps most discouraging, susceptibility to destruction due to mismatch or detuning. This last was especially bad in mobile applications where parking too close to a vertical pipe or having your antenna touch a tree could blow out an expensive power transistor if you happened to be transmitting at the time. Various complex schemes were developed to prevent this from happening, but most were not completely satisfactory. Fortunately, new transistors overcome most of these faults.

As you probably realise, the market for transistors in Amateur equipment is miniscule compared to the market in the mobile communications equipment used in police cars, ambulances, taxicabs, and so forth, not to mention the transmitters used in aircraft and military equipment. However, the Amateur benefits from the improvements that result from developing new transistors for these applications. Because these markets are large and growing, transistor manufacturers have been developing highly improved transistors for these uses.

These new power transistors have higher gain and higher power output than earlier devices (up to 100 watts in one transistor at 175 MHz.). They are also rugged and can withstand detuning and mismatching that would destroy earlier devices. Their cost is reasonable for the applications they are intended for. While prices are still high compared to vacuum tubes which can supply the same power, the advantages of transistors have made them the overwhelming choice in new applications. Very little new communications equipment for mobile use is presently being designed with vacuum tubes.

For applications that require high efficiency, small size, and high reliability transistors are used even when they are quite a bit more expensive than equivalent types. For instance, in aerospace communications, literally dozens of transistors are used in parallel in some applications to obtain very high output.

In spite of this, transistors are not replacing vacuum tubes in all applications. The Amateur operator who wants to put out 2,000 watts is not

likely to use transistors except in the driver stages where the transistor can make a very compact and efficient assembly.

At the present time, low-power transistors are quite reasonable. For higher power a few devices are now becoming available on the surplus market. Most of them are not modern transistors, and suffer from many of the faults that I mentioned before, particularly failure due to mismatching or detuning. Nevertheless, they are quite useful in many applications and are a very good way to get your feet wet in r.f. power before you take on a more expensive project.

For that matter, dedicated Amateurs have never had any real problems in obtaining components for their projects. The serious Amateur who wants to build a high power transistor transmitter can likely get the transistor he needs one way or another, just as he has been able to obtain expensive varactors for microwave use. And even though the transistors are relatively expensive, they are quite reasonable when you consider their advantages; using transistors that operate directly from a car battery, for example, eliminates the need for a relatively expensive, space-consuming inverter.

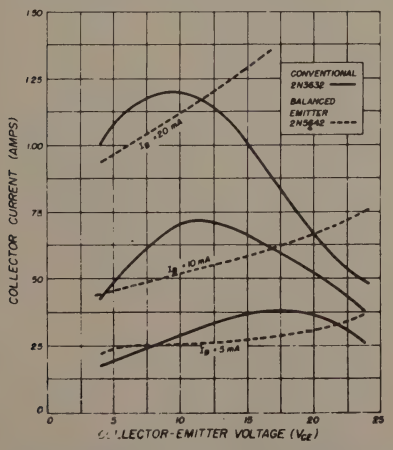


Fig. 1.—Comparison of collector current vs. collector-emitter voltage in conventional and resistor-stabilised transistors (balanced-emitter transistors).

The principles outlined in this article apply equally well to small transistors used in 1 and 2-watt transmitters and to the large transistors that are necessary to get 100 watts or more of r.f. power output. The same design principles are used in all of these applications. The numbers will change, of course, and sometimes the networks used for coupling between the transistors will also change due to the differences in impedance levels. However, if you learn how to design a low-power transmitter you can apply the same principles when higher-power transistors become available to you.

Characteristics of R.F. Power Transistors

Modern r.f. power transistors are made of many individual small transistors in parallel. These transistors are formed at the same time in the manufacturing process. The small transistors are then connected in parallel with aluminium metal that is deposited on the surface of the silicon chip. Each of the small transistors handles relatively little power, hence, can be rather small in size. This is an advantage in high-frequency use.

A further development of this type of construction is the balanced-emitter transistor. Here a small resistor is placed in series with the emitters of the small transistors that are connected in parallel to form the whole transistor.

Fig. 2 shows a typical balanced-emitter transistor. It is the Motorola 2N5637 which can supply an output of 20 watts at 450 MHz. This transistor consists of 220 transistors in parallel, and is stabilised by 220 small thin-film Nichrom resistors. This device, which is more complex than most ICs, is 50 by 100 mils. (0.05 by 0.1 inch) in size. You'll notice that the 2N5637, is made of ten cells. Similar cells are used in other transistors; the 2N5636, which is often used as the driver for the 2N-

5637, consists of six cells and can provide 7.5 watts. The 2N5635 contains two cells and can put out about 2.5 watts.

The reason for this complex construction is that it improves ruggedness. If one small transistor in the large chip starts drawing more current than another one because of some small difference in its construction, the current through it would increase. Then the voltage across the small resistor would increase, increasing the emitter-base voltage. This reduces the amount of current that this individual transistor draws. In other words, it is a self-stabilising operation. No single transistor can draw an excessive amount of current. This protects the transistor from secondary breakdown and permits it to stabilise itself in the event of severe load mismatch or circuit detuning.

Since these small emitter resistors are in parallel, their equivalent resistance is very small and does not result in significant degeneration or loss of gain. On the other hand, if a conventional, older type of power transistor is used with emitter-resistor protection, a resistor large enough to have any significant effect on the ruggedness of the transistor circuit would cause considerable loss of gain and output.

The greatest advantage of balanced-emitter transistors is their ruggedness. A balanced-emitter transistor can stand an infinite v.s.w.r. for a short time in a.m. service, for example. You can also tune one of these transistors without having it blow out, as often happens with older transistors.

Another result of this construction is shown in the I_C/V_{CE} curve shown in *Fig. 1.* Here the collector currents of two transistors with similar output capability are compared. One is a balanced-emitter transistor, the 2N5642. The other is a more conventional transistor, the 2N3632. The 2N3632 contains two chips in parallel in one package, but no emitter stabilising resistors are included in this transistor. You'll notice that as the voltage increases in the balanced-emitter transistor, the current increases proportionately. This shows the excellent linearity which would make it ideal for amplitude modulation or linear amplification. The 2N3632 has a negative resistance region when increasing the voltage results in lower current. This negative resistance region would result in very poor upward modulation, of course, and high distortion in amplifier service.

While most silicon transistors, particularly power transistors, are NPN devices, PNP r.f. power transistors are also made by Motorola. One, the MM-4023, is a balanced-emitter transistor capable of 40 watts output at 175 MHz. The lower-power 2N5160 is a close PNP match of the popular 2N38-66 and can be used in complementary service (see *Fig. 3*).

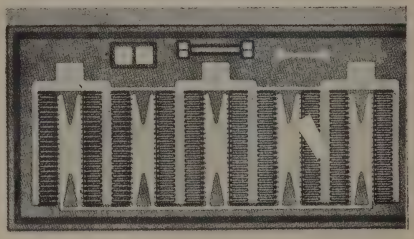


Fig. 2. — The geometry of a Motorola balanced-emitter (resistor stabilised) transistor, the 2N5637, which is capable of 20 watts output (minimum) at 400 MHz. The 2N5637 is composed of 220 individual small transistors connected in parallel, each emitter. This construction provides excellent safe area and resistance to damage from detuning or high v.s.w.r.

Table 1 summarises a number of r.f. power transistors, both conventional and balanced-emitter types. The conventional ones are suitable for low power stages, for drivers, and where they will not be subjected to load mis-

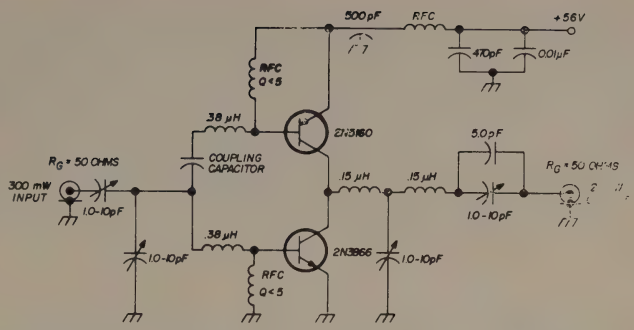


Fig. 3.—300 MHz. complementary r.f. power amplifier using an NPN 2N3866 and PNP 2N5160 transistors.

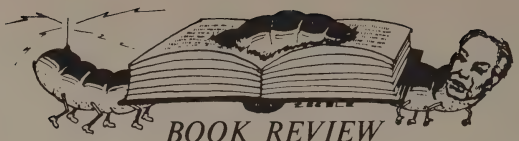
Type	Supply Voltage (c.w. service)	Gain (min. db.)	P_{OUT} (min. W.)	@ f (MHz.)	Case	Single Quantity Cost
2N3866	28	10	1	400	TO-39	$US2.25
2N3375	28	8.8	7.5	100	TO-60	10.80
2N3553	28	10	2.5	175	TO-39	4.37
2N3632	28	5.9	13.5	175	TO-60	12.75
2N4072	13.6	10	¼	175	TO-18	2.25
2N4073	13.6	10	½	175	TO-5	2.70
2N4427	12	10	1	175	TO-39	2.15
2N5160*	28	8	1	400	TO-39	6.75
2N5161*	28	8.75	7.5	175	TO-60	18.75
2N5162*†	28	6	30	175	TO-60	27.00
2N5635†	28	6.2	2.5	400	144B	7.50
2N5636†	28	5.7	7.5	400	144B	22.80
2N5637†	28	4.6	2	400	145A	57.50
2N5641†	28	8.4	7	175	144B	6.40
2N5642†	28	8.2	20	175	145A	21.30
2N5643†	28	7.6	40	175	145A	40.40
2N5644†	12.5	7	1	470	145A-01	11.80
2N5645†	12.5	6	4	470	145A	15.50
2N5646†	12.5	4.7	12	470	145A	29.20
2N5589†	13.6	8.2	3	175	144B	6.10
2N5590†	13.6	5.2	10	175	145A	14.40
2N5591†	13.6	4.4	25	175	145A	25.20
MM1552†	27	7.8	75	150	145C	67.50
MM4018*†	12.5	10	½	175	TO-39	2.20
MM4019*†	28	10	2.5	175	TO-39	6.50
MM4020*†	12.5	11.5	3.5	175	208-1	8.05
MM4021*†	12.5	7.0	15	175	208-1	19.50
MM4022*†	12.5	5.5	25	175	208-1	30.00
MM4023*†	12.5	5.4	40	175	208-1	49.40

* PNP.
† Balanced-emitter transistor.

Table 1.—Typical r.f. power transistors.

match or detuning. Some of these transistors are also becoming available at relatively low prices in surplus. However, only balanced-emitter transistors are recommended for use where they will be modulated, where any significant power is being handled, or for feeding an antenna. *Fig. 4* gives test circuits for some of the transistors. Many of these circuits can be adapted for use in the Amateur bands.

continued next month.



by Colin Duff ZS1CA

AMATEUR RADIO TECHNIQUES by Pat Hawker, G3VA.

An R.S.G.B. Publication.

This new 1970 3rd Edition of Amateur Radio Techniques, compiled by Pat Hawker, who regularly writes "Technical Topics" in the monthly R.S.G.B. magazine *Radio Communication,* is once again a worthwhile addition to the Amateur Book shelf. This 3rd Edition has been substantially enlarged and in order to give you some idea of the contents, let me first quote Pat Hawker.

"In this book we have tried to select, from twelve years of "Technical Topics" — plus some additional material — items and information of lasting value. This is not a book which aims at competing with or displacing the standard handbooks — but rather at extending the readers awareness of new techniques and providing a source-book for many useful circuits and aerials: an ideas book rather than a construction manual or conventional text book".

Many of the ideas and circuits have been gleaned from monthly publications or sister magazines — readers will find reference to articles written in *Radio ZS* by ZS1CK and ZS6AOU. In fact, for the Ham who builds his own gear, makes test instruments or wants to try out a new antenna, this book will provide the necessary impulses for triggering the creative instincts of persons so inclined.

There are nine chapters, covering the fields of Semiconductors, Components, and Construction, Receiver Topics, Oscillator Topics, Transmitter Topics, Audio and Modulation, Power Supplies, Aerial Topics, and lastly Fault Finding and Test Units. 208 pages of useful information, this book is highly recommended and should be available from H.Q. in the near future. RADIO ZS

TIME CONVERSION TABLE

At noon G.M.T. it is:
Middag te Greenwich is:

1 p.m./n.m. — Germany; Austria
2 p.m./n.m. — Russia; South Africa
3 p.m./n.m. — Arabia; Madagascar
4 p.m./n.m. — Mauritius; Iran
5 p.m./n.m. — India
6 p.m./n.m. — Tibet
7 p.m./n.m. — Siam
8 p.m./n.m. — Philipines; West Australia
9 p.m./n.m. — Greenland; Brazil
10 p.m./n.m. — East Australia
11 p.m./n.m. — New Zealand
Midnight — Fiji Islands
1 a.m./v.m. — Alaska; Samoa Island
2 a.m./v.m. — Hawaii; Midway Island
3 a.m./v.m. — East Alaska
4 a.m./v.m. — Pacific Standard Time U.S.A.
5 a.m./v.m. — Mountain Standard Time U.S.A.
6 a.m./v.m. — Central Standard Time U.S.A.
7 a.m./v.m. — Eastern Standard Time U.S.A.
8 a.m./v.m. — Atlantic Standard Time U.S.A.
9 a.m./v.m. — Greenland; Brazil
10 a.m./v.m. — Azores
11 a.m./v.m. — Iceland; Canary Islands

Louis ZS1VD.

NUUS VAN TAK BOLAND

Die merkwaardige vermeerdering van 34 persent in die ledetal van Tak Boland, het nie bloot toevallig geskied nie, dog eerder die beplande en genotvolle vergaderings wat gehou was by Goudini Spa op 2 Mei (teenwoordig 46) en 'n tweede Algemene Jaarvergadering gehou by die Forest Hotel, Grabouw op 18 Julie, (39 aanwesiges).

Beide vergaderings was gekenmerk deur die teenwoordigheid van stoere ou lede soos O.K. Pieter 1CF van Leeugamka, Fred 2FB van Graaffreinet, George 1HD van De Doorns, Fanie 1AI, asook Frikkie 1FC, wat uit die bloute verskyn het. Twee ander teenwoordiges wat ook noemenswaardig is, was ZS1VA, (namens hoofkantoor) en 1CH wat aangebied het om 'n nuusbrief in die lewe te roep.

Die A.J.V. was deur die Voorsitter O.K. Dan ZS1DF ge-open, hy het verslag gelewer i.s. ons beskrywingspunte en al die doen en late by die A.J.V. op Kroonstad, ge-illustreer met 'n pragtige kleur rolprent.

Tak Boland se kwartaal vergaderings is natuurlik in een opsig so onveranderlik soos 'n kerklike geloofsbeleidenis — ek verwys na die genotvolle etes en toesprake wat elkeen lewer.

Pitkos was daar egter ook heelwat, o.a. die onder-onsies weekliks op 80 meter (A.M.) Vrydagaande ± 8 uur, en die 40 meter mobiele wedstryd tussen lede van Tak Boland v Tak Kaapstad. O.K. Dan ZS1DF het as prys 'n pragtige beker geskenk — *die De Vries 40 meter Mobiele Wisseltrofie.*

Medeging sal jaarliks op die 31ste Mei geskied, en oorhandiging aan die wenner, by die volgende Tak A.J.V. O.K. Frank ZS1DJ, het vanjaar gewys hoe sulke bekers soos die eet van soetkoek gewen word.

Vir die edifikasie van diegene wat in die toekoms belang mag stel, meld ons die reëls, nl.

A. **Dag:** 31 Mei en indien hierdie dag 'n Sondag mag wees, sal die gesette tyd die volgende dag nl. 1 Junie die keuse wees.

B. **Tyd:** 600 tot 1800 uur.

C. **Golfband:** Slegs op 40 meter en wel enige mobiele, draagbare, of selfs tuis stel.

D. **Metode:** A.M. of ESB mobiel.

E. **Bewys van kontakte:** In 'n blad met alle besonderhede soos voorgeskrywe volgens standaard dws. geteken en gedateer deur die deelnemer sowel as 'n getuie. Laasgenoemde kan enige persoon 18 jaar of ouer of eggenoot/eggenote wees.

Onthou om die tipe mobiele stel te noem.

Alle log blaaie moet aan die Voorsitter, S.A.R.L. Tak Boland, gestuur word. Ons adres gedurende 1970 sal Posbus 30, Elgin, wees.

Van harte geluk met jul toekomstige pogings.

Feitlik die hele vorige komitee is herkies, met 'n paar bykomstiges. Hierdie

☛

is onteenseglik 'n kompliment, en die tak kan verseker wees, dat alles getuig van die beste in hulle vermoë, hulle is nl.

Voorsitter:	D. de Vries ZS1DF
Vise-Voorsitter:	D. Gavin ZS1NU
Sekretaresse:	Helene Rabie ZS1PJ
Tesoriere:	Anne Gavin ZS1-199*
Bykomstige lede:	Blom 1LO,
	Frank 1DJ,
	Fred 1ZL,
	Alex 1EH,
	Hans 1BZ en

outoriteit van alle outoriteite . . . Paul 1JU.

* Ons Stassen beker wenner.

Nou ja, die einde is nog nimmer verby, *Robertson,* is ons volgende keuse, op 31 Oktober, vir die volgende kwartaal vergadering. Mosies sal ook daar geopper word vir die volgende A.J.V. en volle besonderhede wat die datum, Q.T.H. ens; sal soos van ouds nog betyds verstrek word.

Sakies in Tak Boland is ongetwyfeld aan die beweeg (soos van Bruggen dit sou gestel het) soos 'n warrel wind in 'n taai-bos. Ons was nou reeds verantwoordelik vir die uitgawe van Oktober se Radio ZS, die koerant sal publisiteit aan Tak Boland verleen — en hierdie is maar 'n begin van 'n swetterjoel noemenswaardighede.

Arme Anne sal moet bont staan, want haar O.K. sal nog boon-op die teuels *in hande neem wanneer Dan en sy l.v. in die buiteland vakansie hou.*

Die Stassen beker was ongetwyfeld haar verdiende loon, nie alleen wat sy verrig het nie, maar vir alles wat nog van haar pen moet kom.

Sulke mense was hierdie tak se werklike rykdom, nou het Smittie 1UR en Peggy 1YU, weer al die nodige op Robertson gereël, dus kan julle (en amateurs het glo nie veel nie) die "bottom dollar" wed dat dit in die komende maande met Tak Boland sal goed gaan.

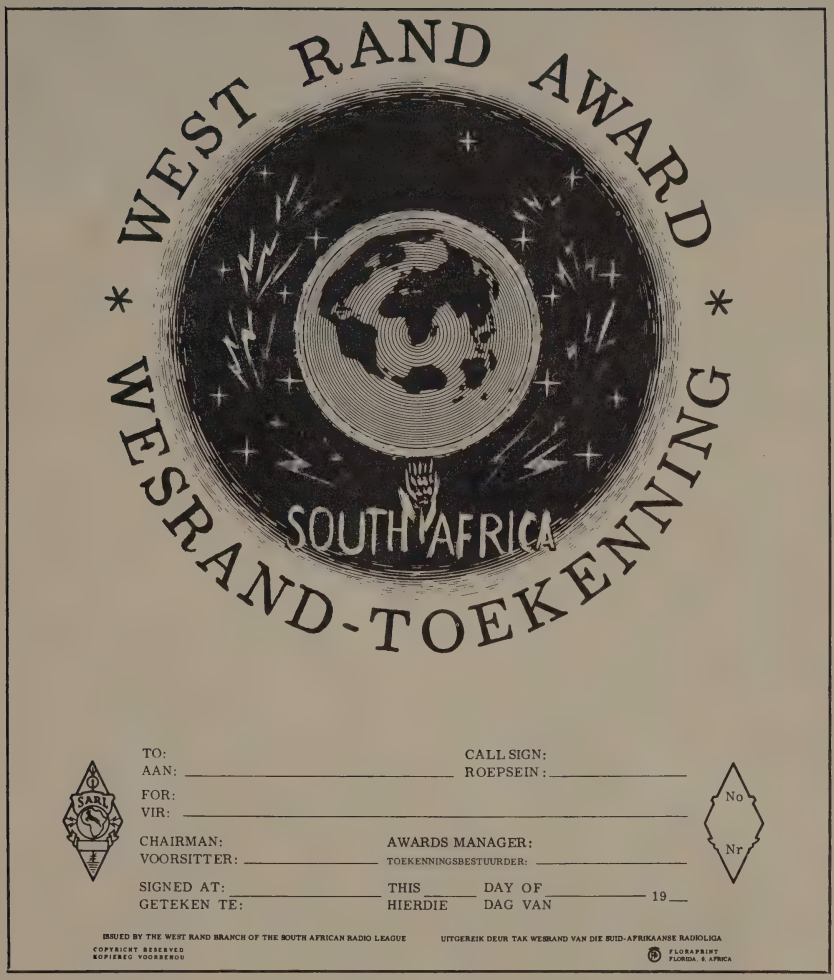
Groetend,
ZS1NP.

TAK WESRAND TOEKENNING

1. Die toekenning word gemaak aan Radio Amateurs en Kortgolf Luisteraars wat kontak bewerkstelling het met lede van Tak Wesrand sedert 1 Januarie 1970. Kontakte op foon moet 'n rapport hê van minimum LS 33 en op gelykgolf van LSN 338. (Gemengde kontakte word nie erken nie.)
2. Alle ZS-amateurs en luisteraars moet QSL-kaarte, om kontakte te bevestig, van twaalf taklede asook 'n posorder van 50c met alle aansoeke aanstuur. QSL-kaarte sal terug besorg word.
3. Alle ander amateurs moet 'n gesertifiseerde loguittreksel (QSL-kaarte nie nodig) wat onderteken is deur twee gelisensieerde amateurs, om kontakte te bevestig, met vyf taklede, asook tien IA koepons met aansoeke saamstuur.
4. Alle aansoeke moet gerig word aan Die Toekenningsbestuurder, Tak Wesrand, S.A.R.L., Posbus 562, Roodepoort, Tvl., S.A.

WEST RAND BRANCH AWARD

1. This award is available to all Radio Amateurs and Short Wave Listeners who made contact with the required number of branch members after the 1st of January 1970. Contacts on phone shall have a minimum report of RS 33 and on CW a minimum report of RST 338. (Mixed contacts not allowed).
2. All ZS-Amateurs and Shortwave Listeners are required to submit QSL cards to prove communication with not less than twelve branch members, plus a 50c postal order with all applications. QSL cards will be returned.



3. All other amateurs and listeners are to submit a certified log extract (no QSL cards required) countersigned by two licenced amateurs to prove communication with five branch members, plus ten IRC's with all applications.
4. All applications must be addressed to The Awards Manager, West Rand Branch, S.A.R.L., P.O. Box 562, Roodepoort, Tvl., S.A.

EAST RAND BRANCH AWARD.

Issued by the East Rand Branch of the S.A.R.L. Zone 38 work any five (5) members of the Branch, DX work any four (4). Membership list will be supplied on receipt of an SASE. GCR (log data) – 40 cents SA or 7 IRC's – Free to Handicapped – Available to SWL's To: Awards Manager, ERB/SARL, P.O. Box 4031, Brencania, Brakpan, Tvl., South Africa.

Awards Manager
Bernie Ackerman ZS6ACK – CHC.

We are very pleased to announce that the new Editress of *Radio ZS,* Mrs. Muriel Alexander ZS1-001, has really done a wonderful job in reducing the expenses of *Radio ZS.* It took a whole day of investigation at the Post Office, but it was discovered that the monthly issue of *Radio ZS,* could be posted for about R8 instead of the usual R46, under the new postal charges. It does mean hard work, though, as the magazines have to be sorted into the various postal districts. Three issues have already been sorted with the help of six helpers. An over all saving of plusminus R450 per year has thus been achieved! Apart from this, *Radio ZS* is again up to date, and doing very well indeed.

On this occasion, we would also like to thank Annie and Koos, who kept *Radio ZS* going under very difficult circumstances, in their spare time. This very fine effort is appreciated by all the League members.

LEAGUE AM CONTEST:

The following are results of the AM section of the annual League Contest:

Winner: *Mrs. van der Watt, ZS6MN, Silent Key Memorial Trophy.*

Second: *Mike Sherman, ZS6IW, Fred Mills Trophy.*

Third: *Bob Tucker, ZS6AAA.*

Highest Single Band: *Louis de Bruin, ZS5LP, 40 metres, Joseph White Trophy.*

Top 20 metre score: *C. Hyman, ZS1CS.*

Top 80 metre score: *Mrs. van der Watt, ZS6MN.*

DX Winner: *R. C. Furzer, ZE1CY.*

Listener Contest:

Winner: *Don Davies, ZS6-184*

Second: *Franz, ZS6-326*

Third: *Ian Parker, ZS4-014.*

The Contest Committee mentioned that out of 67 logs received, only ten were correctly compiled and they request that those who have not yet sent in their SSB logs should first check with the June issue of *Radio ZS* to see that they comply with the conditions as shown in the rules.

RADIO ZS

The Editress of *Radio ZS* has requested that the following information be passed on to our members and all likely contributors to *Radio ZS.* The closing date for copy will be the 10th day of the month prior to publication. That is, copy sent in now and up to the 10th of November will be used for the December issue, thereafter and up to the 10th of December will be for the January issue. The Editress also asks that copy be legibly written, preferably typewritten and double spaced. The Editress has also commented on the lack of advertising and how this has affected the position in which the amendments to the Call-book have been printed. As our readers know, it has become customary to print the amendments so that an advert will be on the back of the page. In this way, the amendments can be cut out of *Radio ZS* without cutting into an article. However, when there is no advert this cannot be done. The alternative of printing amendments on separate sheets would push the cost of printing up to a figure which would be out of proportion to the value of the amendments.

BRANCH COMMITTEES:

The East London Branch informs us that the following were elected at their Annual General Meeting as the Branch Committee for the ensuing year:

Chairman: Arthur Gale, ZS2CK; Vice-Chairman: Jim Carter, ZS2JW; Hon. Secretary: Chris Hundling, ZS2CH; Hon. Treasurer: Errol Mack, ZS2NN; Members: Peter Tomlinson, ZS2OF; Allan Boyle, ZS2A; Bill Laaks, ZS2KW; Chris Bosch, ZS2OP; Colin Robertson, ZS2-009.

The Port Elizabeth Branch elected the following at their Annual General Meeting as their Committee for the ensuing year:

Chairman: Basil Gibson, ZS2PG; Vice-Chairman: Del Colson, ZS2NS; Hon. Secretary: Alan Ansell, ZS2AJ; Hon. Treasurer: Frank Burrell, ZS2CY; Members: Bob Dersley, ZS2BJ, Woody Damp, ZS2WD; Chas Barratt, ZS2CW.

To both of these Committees we offer our congratulations on their election and our best good wishes for a happy and successful year of office. To the retiring committees we offer our thanks for the service which they have given to their branches and to our League.

ANNUAL GENERAL MEETING:

While we still have quite a long time to go before the 1971 Annual General Meeting it is time for us to start thinking about the things which have to be done before December 31st. This is the time to start thinking of motions for discussion at the Annual General Meeting and of nominations for Council.

Motions for discussion may be in the form of amendments of the constitution or for discussion of matters of importance or interest to the members of our League. These must be properly drawn up and submitted to the Headquarters Secretary not later than the 31st December.

Nominations of Councillors for the vacancies must also be received by the Headquarters Secretary not later than December 31st. The procedure for nomination is more complicated than that of a motion and is laid down in Rules 120 to 124 of the Constitution. Under these Rules it is necessary that at least five of the members of Council hold valid Amateur Radio licences; that candidates for nomination shall only be nominated by ordinary members; that nominations be submitted in writing duly signed by the proposer and seconder together with a statement containing details of the specific qualifications and abilities of the candidates; that the candidates name and address be shown; that a written statement of consent signed by the candidate accompany the nomination. Candidates must have been an ordinary member for at least twelve months prior to nomination; must be paid up at the time of nomination and must reside within 40 miles of Headquarters office and may not be a paid employee of the League.

Three members of Council are due to retire at the next Annual General Meeting; they are Messrs. H. Forrer, ZS1FT, J. E. J. van der Merwe, ZS1AW, and H. M. Wilson, ZS1BF, which with the existing vacancy means that at least four nominations are required to bring Council up to full strength. If only four or less nominations are received, it will not be necessary to hold an election. If more than four are nominated then it will be necessary to hold a General Postal Ballot.

NEW AND RE-INSTATED MEMBERS

We wish to welcome the following new and re-instated members to our ranks and hope they will be with us for many years:

DJ9GE	F. H. Schneider,	Pretoria Branch.
	D. E. Krooden,	" "
ZS6-240	W. J. Morris,	" "
ZS6-241	H. J. R. du Plessis,	" "
	P. A. Fox,	" "
	P. E. van der Walt,	" "

	C. Buddingh,	Cape Town Branch.
ZS1DZ	O. C. Carstens,	" "
	A. D. Jordan,	" "
ZS1SM	D. Craddock,	" "
ZS1-001	Muriel Alexander,	" "
ZS1-008	G. Hoberman,	" "
ZS1-010	G. D. Fisher,	" "
ZS1-009	C. G. Beckwith,	" "
	B. Eybers,	" "
ZS6-295	S. R. Swartz, S.	Transvaal Branch.
ZS4-061	P. A. Britz,	Tak Vrystaat.
ZS4-062	H. D. Esterhuizen,	" "
ZS5JT	W. C. Hieber,	Durban Branch.
ZS5-036	L. G. Pople,	" "
ZS5-042	R. A. Brinzer,	" "
ZS5-047	G. N. Fitzjohn,	" "
ZS6ZM	M. N. Zoelner,	" "
ZS5HK	H. J. van Niekerk,	" "
ZS2EK	E. K. Klein	" "
ZS5BN	W. A. R. Perfect	" "
ZS6-C33	J. S. Smit, E.	Transvaal Branch.
ZS6-032	M. Mantz,	" "
ZS6ATY	M. P. Loubser,	East Rand Branch.
ZS2BB	B. B. Aucamp,	Headquarters.
ZE1DS/R	M. N. Smuts,	Associate.
	D. Miller,	East Rand Branch.
ZS6CT	C. J. Engelbrecht,	" "
	H. M. C. Mc Cormick	"
ZS6-121	M. Cohen,	Johannesburg Branch.
ZS6-117	N. D. Miller,	" "
ZS6-118	J. T. Fenny,	" "
ZS6-119	J. C. Coetzee,	" "
ZS6-120	V. M. M. Bulcao,	" "
ZS6BFT	F. B. Atkinson,	" "
ZS6ATG	H. A. Christian,	" "
ZS6-140	J. J. Sajer,	" "
ZS6-123	F. A. Heyworth,	" "
ZS6-124	W. C. Fermoyle,	" "
ZS6AFN	A. L. Bergmann,	" "
ZS6ANZ	B. L. Bresler,	Westrand Branch.
	J. J. Mc Connel,	Highveld Branch.
	R. Groenwalt,	Tak Vrystaat
	H. A. Venter,	" "
ZS1-066	C. J. Vermeulen,	Tak Boland.

Till next time,
73,
Herman Forrer,
ZS1FT.

VEREISTES OM TAK BOLAND TOEKENNING TE VERKRY

A. 20 Volwaardige Tak Boland lede stasies moet gewerk word.
B. 5 DX stasies met 'n minimum rapport van S3 op E.S.B. A.M. of C.W.

Stuur alle Q.S.L. kaartjies aan S.A.R.L. Posbus 32, Elgin.

Hamads

P.O. BOX 137, CAPE TOWN — RATES: R0.50 for 20 words, 2 cents per word thereafter for members. Non-members and commercial smalls: R1.00 for 20 words, 4 cents per word thereafter. PLEASE SEND THE CORRECT AMOUNT WITH EVERY HAMAD OR SMALL.

WANTED: Mobile Transceiver FT100 or similar 12 VDC. Contact H. E. Kirby, ZS6OT, N.A.D.S., P.O. Devon, Transvaal. Phone Devon 71.

FOR SALE: AVQ18 R60; R206 RX R40; Panadaptor (needs repair) R30; 100 watt AM Modulator with Woden Mod. Transformer R25; Revere Two Speed Tape Recorder R50; RF24 and RF26 with power supply R20; Mosley TA33Jr. on 30 ft. tower (buyer to dismantle) R60. Contact ZS6ARD, P.O. Box 384, Pretoria.

WANTED: Heathkit HW100 or equivalent Transciever or separate RX and TX. Contact A. Bergmann, ZS6AFN, 72 Orchard Road, Cheltondale, Johannesburg. Phone 45-1440.

FOR SALE: A.V.O. BRIDGE, R8, MOBILE TRANSMITTER (CORFONE), R15, NEW RADAR TUBES, R10, VALVE TESTER, R8. Contact G. J. White, 144 Brabazon Ave., Mondeor, Tvl.

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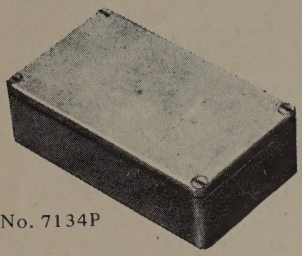

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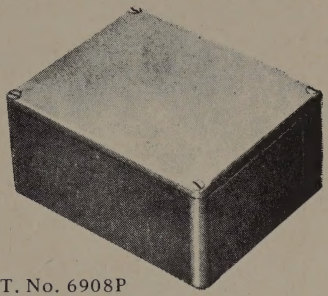

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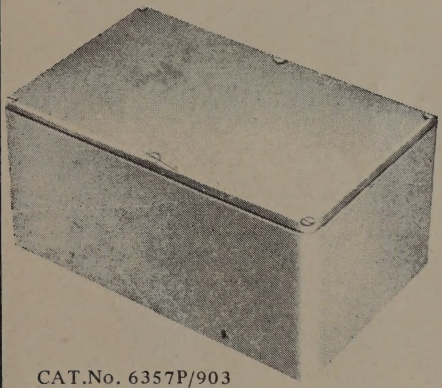

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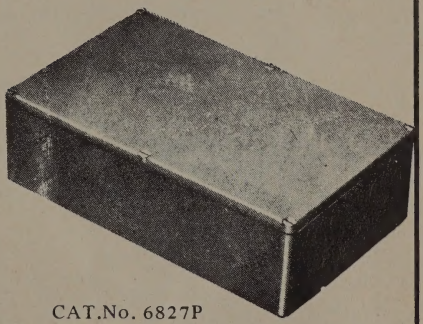

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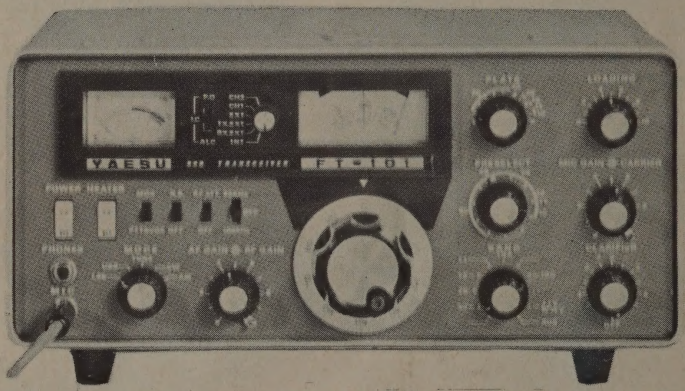

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Sensitivity: 0.3 Microvolt for 10 db S/N
Selectivity: 2.4 KHz (6 db down), 4.2 KHz (60 db down)
*CW Filter — 0.6 KHz (6 db down), 1.2 KHz (60 db down)
Frequency Range: 3.5 to 4, 7 to 7.5, 10 to 10.5, 14 to 14.5, 21 to 21.5, 27 to 27.5, 28 to 30 (Megahertz)

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